

died in 1897, left his property, amounting to 300,000 dollars, to Union College, Schenectady. Suit was brought on behalf of his wife and children, and half of the estate has been awarded to them, while the remaining 150,000 dollars goes to Union College.—Vassar College has received a gift of 5,000 dollars towards the proposed biological laboratory, for which 25,000 dollars has been promised on condition that an equal additional sum shall be raised.—The University of Pennsylvania has received a gift of 250,000 dollars for the construction and equipment of a laboratory of physics.—Wesleyan University has received a gift of 38,000 dollars from Miss Elizabeth A. Mead, subject to an annuity during her lifetime.—St. Lawrence University has received 34,000 dollars from various sources.

SCIENTIFIC SERIALS.

American Journal of Science, December.—The highest aim of the physicist, by H. A. Rowland. Physics is the science above all sciences which deals with the foundation of the universe, with the constitution of matter from which everything in the universe is made, and with the ether of space by which alone the various portions of matter forming the universe affect each other, even at the greatest distances. He who makes two blades of grass grow where one grew before is the benefactor of mankind; but he who obscurely works to find the laws of such growth is the intellectual superior as well as the greater benefactor of the two.—Notice of an aerolite that recently fell at Allegan, Michigan, by H. L. Ward. The mass in question, about 20 inches long and 10 or 12 inches thick, was seen to fall, and dug up a few minutes after it was buried. It was reported to be hot all through, and not cold at the centre as might have been suspected. The stone is very chondritic in structure. It is of a light ash-grey colour, and exceedingly friable, with a black crust averaging 1 mm. in thickness. Optical examination reveals the presence of enstatite, chrysolite, feldspar, troilite and iron, the two last being distributed evenly and thickly as small irregularly shaped grains.—A new meteoric iron found near Iredell, Bosque County, Texas, by W. M. Foote. The meteoritic iron in question was not seen to fall. The three best instances of cleavage are exhibited in one specimen. These are three pairs of perfect adjacent planes forming angles of 120° . The fracture presents a glistening tin-white finely crystalline surface. Grains and plates as much as 2 mm. thick, of a brittle magnetic mineral of pyritiferous aspect are common. A qualitative examination showed the presence of iron, phosphorus and nickel, indicating it to be schreibersite.—Some of the results of the international cloud work for the United States, by F. H. Bigelow. The penetration of ordinary cyclones into the higher regions of the atmosphere is slight. They are only two or three miles deep. Hurricanes are five or six miles deep. The anticyclonic and cyclonic areas are hardly to be considered as centres of motion except in the very lowest strata, since currents of air blow directly across them from west to east, even in the cumulus region of the Rocky Mountain districts. The ordinary circulation theory does not hold good. In each stratum from the surface to the cirrus level about as much air moves north as south, for there are enormous counter currents passing by each other at the same level, and not over one another at different elevations. This puts a new aspect upon the entire problem of the general circulation.

Wiedemann's Annalen der Physik und Chemie, No. 11.—Moving bodies in the electric field, and the electric conductivity of air, by A. Heydweiller. If a sphere rotates uniformly in a medium of different conductivity and in an electric field, and the conductivity of the medium is negligible in comparison with that of the sphere, a couple acts upon the sphere tending to stop its motion. If the conductivities are reversed, the couple tends to accelerate the motion. The author shows that this may account for the stoppage of the moon's original rotation.—Ratio of the electric charge of kathode particles to their mass, by S. Simon. Using Kaufmann's method of magnetic deflection, the author determined the ratio e/m as accurately as possible. He found it to be 1.865×10^7 C.G.S. units, or slightly higher than Kaufmann's value.—On the highest audible and inaudible notes, by R. König. The author investigates notes of pitches ranging from 4096 to 90,000 vibrations per second, produced by bowed tuning-forks. The method of beats is useful for estimating pitches up to the limits of audibility, but the method of Kundt's dust figures is available up to the highest pitches, and is easy

to apply and to deduce results from.—Origin of frictional electricity, by C. Christiansen. A mercury jet was surrounded by twelve jets of zinc amalgam, and both were made to fall side by side through oxygen. As long as the oxygen was somewhat moist, the normal difference of potential of 0.88 volt was indicated between the amalgam and the mercury. But when the moisture was gradually reduced the difference of potential steadily decreased, and finally was reversed in sign at a point where the vapour pressure was about 0.5 mm.—Influence of Becquerel rays upon electric sparks and brushes, by J. Elster and H. Geitel. A spark gap 1 cm. wide, between a positive knob and a negative disc, was exposed to the influence of a radium preparation. The sparks or brushes were immediately converted into a glow discharge, a violet glow surrounding the knob. When the disc was made of cardboard instead of metal, the gap became so sensitive that the radium affected the discharge at a distance of over a metre.—Behaviour of the brush discharge in a magnetic field, by Mr. Toepler. The stratification of the brush discharge is considerably modified by a strong magnetic field. The latter has the effect of crowding the stratifications together, and also of displacing them laterally with respect to each other. An unstable brush discharge is converted into a spark discharge.

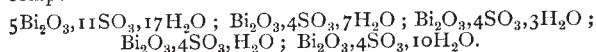
SOCIETIES AND ACADEMIES.

LONDON.

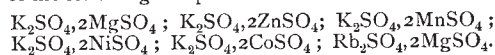
Chemical Society, December 7.—Prof. Thorpe, President, in the chair.—The following papers were read.—The oxidation of certain organic acids in presence of ferrous salts, by H. J. H. Fenton and H. O. Jones. The authors have examined the oxidation products of a number of carboxylic acids and of picric acid by hydrogen peroxide in presence of ferrous salts.—Oxalacetic acid, by H. J. H. Fenton and H. O. Jones. Free oxalacetic acid, $C_4H_4O_5$, is obtained on oxidising malic acid in presence of ferrous salts.—Determination of the constitution of fatty acids (Part ii.), by A. W. Crossley and H. R. Le Sueur. Ethylisopropylmalonic acid yields ethylisopropylacetic acid,



by elimination of carbon dioxide. Ethylic α -bromethylisopropylacetate yields, on treatment with diethylaniline, a mixture of ethylic dimethylethylacrylate and ethylic methylisopropylacrylate.—The reaction between sulphuric acid and potassium ferrocyanide, by R. H. Adie and K. C. Browning. The action of acid of the composition H_2SO_4 or $H_2SO_4 \cdot H_2O$ upon potassium ferrocyanide consists in the formation of potassium sulphate and hydroferrocyanic acid and in a partial evolution of carbon monoxide; all the cyanogen in potassium ferrocyanide is converted into carbon monoxide by acid of the composition $H_2SO_4 \cdot 2H_2O$. Acid of the composition $H_2SO_4 \cdot 4H_2O$ to $H_2SO_4 \cdot 10H_2O$ similarly converts the salt into hydrocyanic acid and Everitt's salt, $K_2Fe_2Cy_6$.—The sulphates of bismuth, by R. H. Adie. By the action of sulphuric acid of different concentrations, the author has obtained solid salts of the following compositions:



—On sulphates of the form $R_2SO_4 \cdot 2MSO_4$, especially those of isometric crystallisation, by F. R. Mallet. By fusing the constituent salts together, the author has obtained cubic double salts of the following compositions:



—Reactions of the so-called dibenzylamine, by F. R. Japp and J. Moir. The authors describe the chemical behaviour of dibenzylamine, which they have previously shown to be benzoyl-*s*-dibenzyl-*i*-diphenylethylenediamine.—Note on isoamarine, by H. L. Snape. The author has resolved isoamarine into its optically active components, thus confirming Japp and Moir's view of its constitution.—On the preparation of benzeneazoothionitrophenol, by J. T. Hewitt. Benzeneazophenol is converted into benzeneazoothionitrophenol by dilute nitric acid.—Some new osazones and tetrazones, by H. A. Auden.—A series of substituted nitrogen chlorides. Part ii. The trichlorophenylacetyl chlorides, by F. D. Chattaway and K. J. P. Orton.—The reaction between cupric sulphate solution and magnesium, zinc and iron, by R. M. Caven.

Geological Society, December 6.—W. Whitaker, F.R.S., President, in the chair.—Dr. Blanford described certain photographs sent by Mr. E. H. L. Schwarz, and representing the Dwyka boulder-bed and the rounded and grooved underlying surface, in the neighbourhood of the Orange River near Hopetown and Prieska. The importance of these photographs lay in the evidence which they afforded on a disputed point. Dr. Sutherland and Mr. Griesbach had called attention to the evidence of ice-action presented by the Dwyka Conglomerate in Natal, and additional evidence had been brought forward by several observers, especially by Mr. Dunn from the Orange Free State and Cape Colony, and recently by Dr. Molengraaff from the Transvaal. Other observers, however, and especially the late Prof. Green, had disputed the glacial origin of the Dwyka beds. The photographs now exhibited would, the speaker thought, convince most geologists that the phenomena presented were due to ice-action. The resemblance to similar photographs shown to the Society in 1896 by Prof. T. W. Edgworth David, and representing the beds corresponding to the Dwyka Conglomerate in South Australia, was noteworthy. Evidence of glacial action in Upper Palaeozoic times had gradually accumulated from India, Australia, and South Africa, and there was a probability that similar indications existed in South America.—On the geology and fossil corals and echinids of Somaliland, by Dr. J. W. Gregory. British Somaliland consists of a high plateau, of which the northern scarp is separated from the Gulf of Aden by a belt of low hills and plains known as the Guban. The southern plateau consists of Archæan gneisses, quartzites, amphibolite-schists, chloritic schists, and pegmatites. It is capped by purple grits, red sandstones, and conglomerates, which are covered by limestones of Neocomian, Turonian (? Cenomanian), and Eocene ages. The Neocomian limestone, which may be correlated with that of Singeli described by Rochebrune, occurs at Dobar in the Guban; while a Jurassic limestone, probably of Bathonian date, occurs at Bihendula in the Guban. Fossils collected from these limestones and from raised reefs of Pleistocene age, have been examined by the author, who tabulates a list of corals and echinids. The evidence of the collections is sufficient to show that a Neocomian limestone occurs both on the summit of the Somali plateau and on the floor of the Guban, and that some marine limestones of Lower Tertiary age (probably Eocene) also occur on the plateau. It is therefore evident that the foundering of the Aden Gulf is post-Eocene in age.—Note on drift-gravels at West Wickham (Kent), by George Clinch. The author describes two beds of drift-gravel at West Wickham. The first, occupying the bottom of a dry valley, yields in a section exposed at Gates Green, material derived from the Chalk and the Lower Greensand; and distinct, although perhaps not direct, relation with the denudation of the Weald is claimed for it. The other bed of gravel is of later age, and has yielded many Palæolithic implements and flakes.—On the occurrence in British carboniferous rocks of the Devonian Genus *Palaeoneilo*, with a description of a new species, by Dr. Wheelton Hind. The family Nuculidæ is represented in carboniferous rocks by the genera *Nucula*, *Nuculana*, and *Ctenodonta*, and to these must now be added *Palaeoneilo*, which the author describes from two fine specimens in the Museum of Practical Geology, from carboniferous shale (Yoredale Shale) south of Hammerton Hall, Slaidburn, Yorkshire. It is remarkable that a genus so well developed in Devonian times should be found at the top of the carboniferous limestone series, but not in intermediate beds. Hall's diagnosis of the genus is given, with additional remarks, and a new species is described and contrasted with *Ctenodonta (Palaeoneilo) lirata*, Phil., from the Devonian of Baggy.

Entomological Society, December 6.—Mr. G. H. Verrall, President, in the chair.—Mr. J. J. Walker exhibited a specimen of *Colias marnoana*, Rogenh., taken at Massowah, on the Red Sea. He considered this form to be only a dwarfed race of *C. hyale*, Linn.; and for comparison with it, he showed specimens of the var. *nilgherriensis*, Feld., from Central India, and of the var. *simoda*, De L'Orza, from Japan.—Dr. Chapman exhibited a series of specimens, selected from various English collections, together with a few foreign examples, to illustrate the English forms found within the genus *Fumea*. He read some notes relating to the genus, and to characters, chiefly drawn from structure, by which the different species may be distinguished.—Mr. Malcolm Burr called attention to Dr. Sharp's paper on the modification and attitude of *Idolum diabolicum*,

recently published in the *Proceedings* of the Cambridge Philosophical Society (vol. x. part iii.). He exhibited the plate, drawn after nature by Mr. Muir, which illustrates the paper, pointing out that no drawing of this kind showing a Mantid in its natural colours simulating the petals of a flower, had hitherto been published. He also exhibited species of Mantodea of various genera, to show the different modifications by means of which insects of this group are made to resemble leaves and flowers.—Mr. Kenneth J. Morton communicated a paper entitled "Descriptions of new species of Oriental *Rhyacophilæ*."

DUBLIN.

Royal Dublin Society, November 22.—Prof. E. J. McWeeney in the chair.—Prof. T. Johnson read a paper on the yellow blight of the potato-plant, an examination of which he had undertaken at the request of the Congested Districts Board of Ireland. The disease is especially prevalent in the west, but is found throughout Ireland. The two fungi held mainly responsible for the disease, of which an illustrated account was given, are considered to be *Sclerotinia sclerotiorum* (Lib.), Massee, and *Rhizoctonia Solani*, Kühn, the "small-pox" fungus of the potato-tuber. At the Winter Show of the Royal Dublin Society, of several hundred dishes of potatoes there was scarcely a dish with tubers free from the sclerotia and mycelium of *Rhizoctonia*, hitherto not recorded in Ireland.—Mr. G. H. Carpenter read a paper on some Collembola from Franz-Josef Land, collected by Mr. W. S. Bruce, of the Jackson-Harmsworth Expedition in 1896 and 1897. Seven species are represented in the collection, one of which—an *Isotoma*—is new to science. Mr. Carpenter also presented a paper on Pantopoda from the Arctic Seas, dredged by Mr. Bruce in 1897 and 1898.—Dr. F. T. Trouton, F.R.S., exhibited Caldwell's modification of the electrolytic interrupter, and drew attention to his explanation of the curious transference flow which occurs from one side to the other through the narrow opening or hole in the dividing partition. The direction of the flow being independent of the direction of the current points to a heating effect. When the explosion in the hole occurs through the sudden evolution of vapour liquid is ejected to both sides; but should the position of the explosion in the hole move, through any cause, to one side, more liquid will be thrown to the other. The bubbles of vapour must tend to form on the side of lowest pressure, thus accounting for the phenomenon. In the apparatus shown, the number of breaks per second was about 750, the volume of the hole about .0011 c.c.; thus the limit to the rate of flow is about .4 c.c. The maximum observed was about .3.

Royal Irish Academy, December 11.—Dr. Benjamin Williamson, F.R.S., in the chair.—Dr. Henry H. Dixon read a paper on the first mitosis of the spore-mother cells of lilium. In this paper observations and arguments are adduced in favour of regarding the double twisted condition of the nuclear thread in this mitosis as arising from the folding and twisting together of parts of the dolichonematous thread. The double thread parting transversely forms the chromosomes, which are thus composed of two twisted portions, each a primary chromosome. In the equatorial plate each *primary chromosome* divides longitudinally. A pair of the longitudinal halves forms the V-shaped daughter chromosome. It is also shown that the unravelling of the halves of the twisted primary chromosomes naturally explains the constant V-form of the daughter chromosomes. From this it will be seen that the mitosis is not a "reducing" division in Weismann's sense. The manner of the formation of the chromosomes brings into proximity in the dispirem stage parts of the nuclear thread which were, in the spirem stage, distant from one another.—Prof. C. J. Joly read a paper on some applications of Hamilton's operator ∇ in the calculus of variations. In the case of positional variations, the conditions for a stationary value of the

integral $\int f dp, \int f dq$ being a linear and distributive function of the vector element dp of a curve, may be expressed by the relation $f \delta p = 0$ at the limits, and $f \nabla \nabla dp \delta p = 0$ at each point of the curve. In the second equation, ∇ operates on f alone. For surface integrals, $\iint F d\omega$ where $d\omega$ is a directed element of area, the conditions are $F \nabla = 0$ over the surface, and $F \lambda = 0$ over the boundary, λ being normal to a fixed surface on which the boundary lies. Examples were given for the use of these formulæ.

PARIS.

Academy of Sciences, December 11.—M. van Tieghem in the chair.—The perpetual secretary announced the receipt of the last American contribution to the Lavoisier Fund, the total amount received from the United States amounting to 3054 francs.—On the parallax of the sun, by M. Bouquet de la Grye. The Academy of Sciences in 1882 sent out ten parties of astronomers to observe the transit of Venus across the sun, and in the present paper the final results of these observations are given. The mean of the results obtained by Halley's method with the large telescopes is $8''.7996$, with all the telescopes $8''.8068$; the adopted result is: $8''.80 \pm .01$. The calculations of the results from the photographic methods are not yet completed.—Note on the work done on Mt. Blanc in 1899, by M. J. Janssen. The note contains details of work done in two directions, (1) on the losses that an electric cable undergoes when it is placed bare upon the glacier, and (2) on oxygen in the sun. The first work was unfortunately attended by a fatal accident to one of the observers, M. Caurio, who fell on to the glacier on which the experiments were being carried out. The work was finished by M. Lespieau. It was found that naked wires of galvanised iron were quite serviceable for telegraphing between the observatory and points varying from 300 to 1700 metres distant, a 3 mm. iron wire lying on a length of 1700 metres of glacier ice not constituting a telegraphic "earth." As regards the solar oxygen, the photographs of solar spectra obtained during the year will be discussed subsequently.—Influence of the magnetic field upon the radiation of radio-active bodies, by M. Henri Becquerel. In a non-uniform magnetic field, constituted by a powerful electromagnet, the radium rays are bent and concentrated on the poles. The results were most clearly shown by the aid of photography, a horizontal sensitive plate, covered with black paper, being placed between the two poles 45 mm. apart parallel to the field. Before exciting the magnet the radio-active barium chloride was placed upon the plate half-way between the poles. The maximum deviation corresponds to the direction normal to the field. These results have been obtained independently by MM. Meyer and Schweidler by the use of a fluorescent screen.—On a general method for the estimation of some elements contained in organic compounds, by M. Berthelot. By combustions in oxygen in the calorimetric bomb, at a pressure of 25 atmospheres, accurate estimations of carbon, sulphur and phosphorus are readily carried out if suitable precautions are taken, the most important for the two latter elements being the addition of a certain quantity of naphthalene or camphor. The determination of potassium, the alkaline earths, copper, iron, silver, or mercury presents no difficulties.—On the molecular refractions, molecular dispersions and specific rotatory power of some alkyl-camphors, by MM. A. Haller and P.-Th. Muller. Measurements are given for benzylidene-, piperonylidene-, cuminyl-, ethylsilyl-, methoxybenzyl-, and anisyl-camphors, and the results compared with the figures given by the calculations of Bruhl and Conrady; the experimental results are in general higher than the calculated values. The authors suggest the double linkage connecting the camphor and aldehydic residues as the cause of the deviations.—Remarks by M. Duclaux on his treatise on microbiology.—Note on the Bielids observed at Algiers on November 28–29, by M. H. Tarry.—On the theory of discontinuous functions, by M. R. Baire.—Method for determining the mean density of the earth and the constant of gravitation, by M. Al. Gerschun. If a heavy sphere is brought near the free surface of a liquid at rest, this surface takes the form of a surface of equal Newtonian potential, arising from the simultaneous action of the earth and the heavy sphere. The expression $\frac{R}{\rho} = 1 + \frac{d}{\delta} a^3$ is deduced, where R is the earth's radius, d the density of the sphere, δ the mean density of the earth, and a the ratio of radius of the sphere to the distance of its centre from the free liquid surface, and ρ the radius of the osculating surface to the liquid at its highest point. To determine ρ an optical method is employed of great delicacy, given by Foucault for verifying the truth of plane optical surfaces. Some preliminary experiments on the method show that its precision is not less than those previously in use, neither are the experimental difficulties greater.—On the principle of equality of action and reaction, by M. André Broca.—Action of aluminium chloride upon camphoric anhydride, by M. G. Blanc. The chief product of

this reaction is isolaunonic acid. The secondary products are a mixture of acids, having formulae, $C_9H_{14}O_2$ or $C_9H_{16}O_2$ and a lactone $C_9H_{14}O_2$.—Alkalimetry of the amines, by M. A. Astruc. The fatty amines examined ranging from methylamine to diamylamine are monoacid bases with either helianthine or phenolphthalein as indicator. The primary aromatic bases, on the contrary, are neutral to phenolphthalein, but behave as monoacid bases to methylorange.—On the co-existence of a reducing and an oxidising diastase in animal organs, by MM. J. Abelous and E. Gerard. It is shown that in aqueous extracts of the kidney of the horse, two ferments are present, one of which can reduce a nitrate to nitrite, and the other produce the inverse reaction.—On the presence of mannocellulose in the ligneous tissue of gymnosperms, by M. Gabriel Bertrand.—A contribution to the history of intraocular pressure, and to our knowledge of the mechanism of blood pressure in the capillaries, by M. W. Nicati. Measurements of the hardness of the eye show that the blood pressure of the capillaries is proportional to the ratio between the volume of the body and its surface.—New observations of American *Peripatoides*, by M. E. L. Bouvier.—On a new pathogenic *Mucor*, by MM. Lucet and Constantin. This fungus was found to be the cause of a disease of the respiratory organs, at first mistaken for tuberculosis. The disease was cured by treatment with arsenic and potassium iodide. The fungus was found to be a new species, differing from the four pathological species previously known. The name proposed by the authors is *Rhizomucor parasiticus*.—On a new mode of formation of the egg in *Piptocephalis*, by M. Matruchot.—On the mountain chain of Chartreuse, by M. H. Révil.—The *facies* and conditions of deposit of the Turonian in Aquitaine, by M. Ph. Glangeaud.—On new subterranean researches in Dévoluy (Hautes-Alpes), and on the deepest natural well known, by M. E. A. Martel. The shaft found has a depth of at least 310 metres, and is probably greater.—Approximate determination of the denudation of Cretaceous rocks on the coasts of Normandy, by M. J. Thoulet.

CONTENTS.

PAGE

The Coming Wheat Scarcity. By Sir R. Giffen, K.C.B., F.R.S.	169
The Physical Atlas. By W. E. P.	171
The North American Slime Moulds	173
A New Materia Medica.	174
Our Book Shelf:—	
Tilman: "Descriptive General Chemistry."—A. S.	175
Griffini: "Zoologia."—G. B. H.	175
"The British Journal Photographic Almanac for 1900"	175
Getman: "The Elements of Blowpipe Analysis"	176
Lachlan: "The Elements of Euclid." Books I.–VI.	176
Cuniasse and Zwilling: "Essais du Commerce et de l'Industrie"	176
Richmond: "Dairy Chemistry"	176
Cheyne and Burghard: "A Manual of Surgical Treatment."—D'A. P.	176
Letters to the Editor:—	
Stockholm International Conference on the Exploration of the Sea.—Prof. W. A. Herdman, F.R.S.	177
Meteorology at the Berlin Geographical Congress.—A. Lawrence Roth; The Writer of the Report	177
Shadows of Insects.—Wm. Parkinson	177
Mosquitoes and Malaria.—Dr. R. Hanitsch	177
The Great Paris Telescope. (Illustrated.) By Sir Norman Lockyer, K.C.B., F.R.S.	178
Geological Survey of the United Kingdom	181
Sir Richard Thorne Thorne, K.C.B., F.R.S.	183
Notes	184
Our Astronomical Column:—	
New Minor Planet (1899 E.Z.)	187
Change in Publication of the <i>Astronomische Nachrichten</i>	187
Companion to the Observatory	187
Recent Researches on Uric Acid	187
University and Educational Intelligence	189
Scientific Serials	190
Societies and Academies	190